

RECENT MAMMALIAN SUB-FOSSILS OF THE BASALT PLAINS OF VICTORIA

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Abstract

Details are given of 8 W. Victorian sites which have yielded mammalian sub-fossils, and some corrections are made to previously published identifications of specimens. A table shows the species represented in each of these deposits and the approximate number of individuals of each species in the respective collections. Evidence is presented which suggests a post-Pleistocene period more arid than the present. Details are given of the virtual disappearance during the past century of the modern mammalian fauna of the basalt plains, particularly as regards members of the Macropodidae and the Muridae.

Introduction

The study covers native mammals of species which have been known as living animals during European occupation of Australia. The dingo (*Canis familiaris dingo*) is not included, however, as the local fossil record of this form needs further examination.

During the past three years (1961-1963), several large collections of sub-fossil mammalian bones have come to hand from caves in W. Victoria. Material from these has been classified specifically and assessment made in each case of numbers of individuals of each species. In almost all cases, the lower jawbones (dentaries) have been used for these purposes. Some of the results have already been published (Wakefield 1963a, b, c, 1964).

Literature has been examined for lists of mammalian fossils and sub-fossils from sites in or about the basaltic areas of W. Victoria. Material upon which these reports were based has been examined in the palaeontological collections of the NMV (National Museum of Victoria). Further identifications have been made and, in a few cases, old ones corrected. This material has been analysed quantitatively also.

The species which have been identified from the main sites, and the numerical analysis of each major collection, are set out in Table 1.

Sub-fossil Sites

The location of each site which is discussed in this paper is indicated by reference to places marked on the geological map of the basalt plains which accompanies this article.

TOWER HILL BEACH (7 miles WNW. of Warrnambool)

Mahony (1912) identified a number of mammals from this site, and Gill (1951) added some names to the list. Three more macropodids—*Protemnodon greyi*, *P. rufogrisea*, and *Aepyrymnus rufescens*—have now been identified in the collections, and the material of *Perameles* has been determined specifically partly as *P. gunnii* and partly as *P. nasuta*.

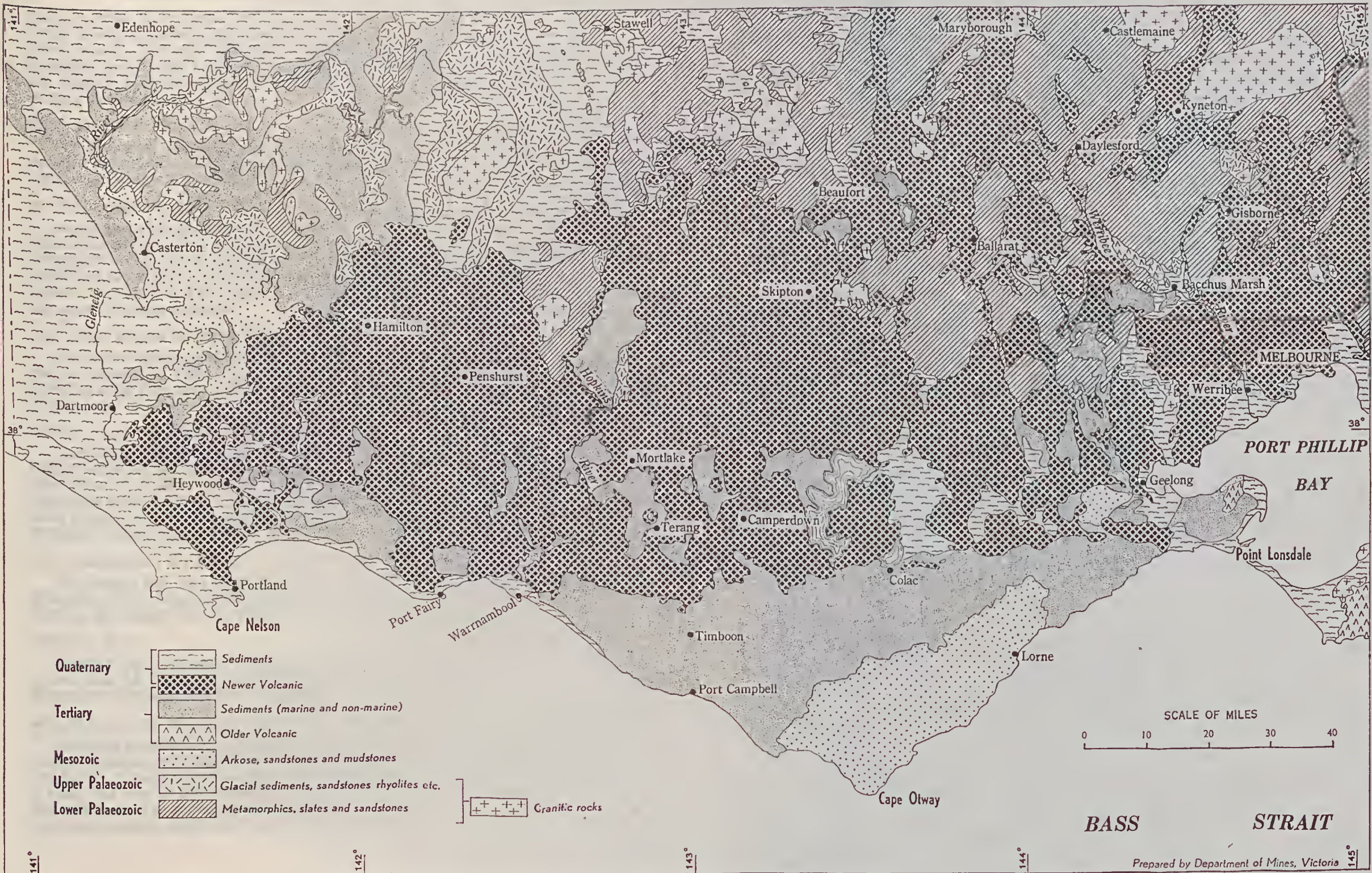
BUSHFIELD (5 miles N. of Warrnambool)

The description of this site by Gill (1953b) included a list, based on identifications by C. W. Brazncor, of 11 species of marsupial and 2 murids. During the present

TABLE 1

*Analysis of Sub-fossil Mammalian Collections from W. Victoria,
Showing Approximate Numbers of Individuals Identified from Each Site*

	Fern Cave, Lower Glenelg	Natural Bridge, Mt Eccles	Byaduk Caves	Mt Hamilton	Bushfield	Tower Hill Beach	Swain's Cave, Mt Porndon
DASYURIDAE							
<i>Antechinus flavipes</i>	—	2	8	—	—	—	—
<i>Antechinus stuartii</i>	46	44	8	—	1	—	—
<i>Antechinus swainsonii</i>	79	36	15	—	4	—	—
<i>Phascogale tapoatafa</i>	7	—	1	—	—	—	—
<i>Sminthopsis crassicaudata</i>	30	8	4	3	—	—	—
<i>Sminthopsis leucopus</i>	63	34	10	—	1	—	—
<i>Dasyurus quoll</i>	22	16	6	20	8	1	1
<i>Dasyurops maculatus</i>	19	—	—	2	2	7	1
<i>Sarcophilus harrisii</i>	2	—	—	60	2	1	—
<i>Thylacinus cynocephalus</i>	—	—	—	1	—	—	—
PERAMELIDAE							
<i>Isodon obesulus</i>	250	1	8	5	1	18	—
<i>Perameles gunnii</i>	11	22	30	80	12	8	—
<i>Perameles nasuta</i>	7	—	—	—	—	2	—
PHALANGERIDAE							
<i>Acrobates pygmaeus</i>	14	11	—	—	—	—	—
<i>Cercartetus nanus</i>	18	28	18	—	—	—	—
<i>Petaurus norfolcensis</i>	—	—	10	—	—	—	—
<i>Petaurus breviceps</i>	15	6	10	—	1	—	—
<i>Pseudocheirus peregrinus</i>	6	—	12	—	4	4	—
<i>Trichosurus vulpecula</i>	21	2	1	5	2	1	6
PHASCOLOMIDAE							
<i>Phascotomys mitchellii</i>	1	1	—	3	7	11	1
MACROPODIDAE							
<i>Bettongia gaimardi</i>	4	—	—	2	—	—	—
<i>Bettongia lesueur</i>	—	—	—	7	6	—	—
<i>Aepyprymnus rufescens</i>	1	—	—	20	—	4	—
<i>Potorous tridactylus</i>	47	1	—	1	2	5	2
<i>Lagorchestes leporides</i>	3	—	—	1	—	—	—
<i>Onychogalea unguifer</i>	—	—	—	6	—	—	—
<i>Onychogalea fraenata</i>	—	—	—	1	—	—	—
<i>Petrogale penicillata</i>	—	—	1	—	—	—	—
<i>Thylogale billardieri</i>	15	—	—	—	3	44	—
<i>Protemnodon bicolor</i>	2	—	—	—	—	—	—
<i>Protemnodon rufogrisea</i>	33	1	1	—	4	8	1
<i>Protemnodon greyi</i>	—	—	—	7	—	2	—
<i>Macropus cangaru</i> (= <i>major</i>)	4	—	—	1	1	8	—
MURIDAE							
<i>Hydromys chrysogaster</i>	3	—	4	1	1	—	—
<i>Rattus lutreolus</i>	189	108	18	3	14	1	—
<i>Rattus greyii</i>	157	103	63	—	—	—	—
<i>Pseudomys auritus</i>	125	157	4	12	1	—	1
<i>Pseudomys</i> sp.	—	581	11	30	17	—	—
<i>Thetomys</i> cf. <i>gracilicaudatus</i>	72	61	73	—	—	—	—
cf. <i>Gyomys novaehollandiae</i>	34	17	5	—	—	—	—
<i>Mastacomys fuscus</i>	209	306	89	—	10	—	2
<i>Conilurus albipes</i>	43	24	23	12	—	—	—



Geological map of south-western Victoria, featuring Newer Volcanic plain

study, a further 7 marsupials and 3 murids have been recognized, namely: *Antechinus stuartii*, *Dasyurops maculatus*, *Perameles gunnii*, *Petaurus breviceps*, *Bettongia lesueur*, *Thylogale billardieri*, *Hydromys chrysogaster*, *Rattus lutreolus*, *Pseudomys auritus*, and a second species of *Pseudomys*. However, 2 species originally listed by Gill—*Protemnodon bicolor* and *Rattus assimilis*—were not found amongst the material.

SKENE STREET CAVE (Warrnambool)

Two specimens which had been identified for Gill (1953a) as *Aepyprymnus rufescens* are, in fact, of *Bettongia lesueur*. This site, like the Mt Hamilton lava caves, was evidently a 'death trap'.

MT HAMILTON LAVA CAVES (22 miles WSW. of Skipton)

An account of the mammalian sub-fossils from this locality was given, and the misidentification of a piece of *Lagorchestes leporides* (as *Thylogale billardieri*) was subsequently corrected (Wakefield 1963a, b). A second amendment is needed to the original account: on p. 325, the sentence about 'an adult maxilla . . . with heavier dentition than in other adult Victorian specimens' belongs under *Bettongia lesueur*, not under *Bettongia gaimardi*.

FERN CAVE, LOWER GLENELG AREA (10 miles S. of Dartmoor)

The mammalian remains from this site have been documented (Wakefield 1963b) and are included in Table 1 for comparison with the faunas of other sites. The formation at the Fern Cave is dune limestone, carrying a medium forest with thickets of shrubbery.

BYADUK CAVES (11 miles S. of Hamilton)

There were several collections from various parts of the series of caves. The largest deposit, in the cave known as 'Harman Two', was an accumulation of owl pellet material. A minor amount of the bone material in the caves was probably taken there by the quoll or 'native cat' (*Dasyurus quoll*). An analysis of the Byaduk caves material, showing the composition of each collection, has been published by Wakefield (1964), but in Table 1 all this material is treated as a unit.

'NATURAL BRIDGE', MT ECCLES (16 miles E. of Heywood)

The locality has been described and an analysis of the deposit published by Wakefield (1964). Much of the deposit was certainly owl pellet material but some elements of it suggest that the place was also a den of *Dasyurus quoll*.

GISBORNE CAVE

Mahony (*l.c.*) discussed mammalian sub-fossils which had been collected in a cave near Mt Gisborne, approximately 30 miles NW. of Melbourne. J. A. Mahoney is discussing this fauna elsewhere.

SWAIN'S CAVE, MT PORNDON (11 miles SE. of Camperdown)

Sub-fossil material was collected in 1960 by members of the Field Naturalists Club of Victoria, in a small cave at the southernmost portion of the Mt Porndon ring barrier, 1 mile S. of the mountain and 4 miles SW. of Stonyford. The collection is small, and most of it is probably of animals that have used the cave as a shelter and died there. The same applies to occasional specimens of wallaby and possum which are found in collections from other sites under study.

Distributional Data*Sarcophilus harrisii*

Besides the several C. and SW. Victorian records in the literature cited, there is a specimen from L. Weeranganuk (NMV, P.22773, *leg.* A. House, 1962). As a modern animal, the 'devil' is known only from Tasmania, but it was evidently widespread and abundant formerly on and about the W. District basalts. There is no record of it from E. Victoria.

Perameles nasuta

There are no data of the Long-nosed Bandicoot as a living animal W. of the Otway Ra. area. The Tower Hill beach record provides a link with the sub-fossil record of it at the Fern Cave S. of Dartmoor.

Petaurus norfolcensis

The distribution of the Squirrel Glider in this State is not well known, but it appears to belong to the more open forests of N. and west-central Victoria. The Byaduk records evidently represent its westernmost occurrence, as it is absent from the numerous sub-fossil deposits of the Portland-Glenelg area.

Bettongia lesueur

The sub-fossil specimens from the Warrnambool area (Skene Street and Bushfield) are of a small form of the species. At Mt Hamilton a single specimen of a large form was found, as well as several of the small form. A fossil skull (NMV, P.22772), which appears to be of the small form, was found at Deep Ck, '1½ miles below Carisbrook'. There is scope for a valuable study of variation between populations of this species, both geographically with modern specimens and through time with fossil material.

Petrogale penicillata

The Byaduk specimen was found in 1961 by L. K. M. Elmore, in the Bridge Cave 'on rocks in cavern behind bat chamber'. It comprises most of a skull, with adult dentition, and large pieces of post-cranial bones. The specimen appears to be older than other Byaduk sub-fossils, and it is the sole indication that the species ever occurred in W. Victoria. As the locality is some 300 miles outside the known modern distribution of the species and is in a different habitat (Wakefield 1963d), the material should eventually be accurately dated.

Onychogalea unguifer

As the species is known as a living animal only from N. Australia (Troughton 1941), the sub-fossil specimens from Victoria are of considerable interest.

Onychogalea fraenata

There is no authentic record of the Bridled Nail-tail Wallaby as a living Victorian animal, but a sub-fossil skeleton was found near L. Hindmarsh in 1959 by M. W. Johns and C. R. Lawrence (Mines Department Geological Museum, Melbourne).

Protemnodon greyi

The Tower Hill beach record is a useful adjunct to the recent discovery of remains of the Toolach Wallaby at Mt Hamilton, as each locality is about 100 miles E. of the previously known range of the species. Distributional data for the species were documented fully by Finlayson (1927).

Rattus greyii

As a modern animal, Grey's Rat appears to be confined in Victoria to the

Portland-Lower Glenelg area. Its previous occupation of the Grampians was demonstrated recently by Wakefield (1963c), and its presence in the W. end of the basalts indicates that it had a general range from the Grampians to the sea.

Pseudomys auritus

The records now available show that the species was widely distributed on and lateral to the basaltic areas. *P. auritus* has not been recorded as a living animal since the type specimen was obtained at L. Albert, South Australia, in 1853 (Troughton 1941).

Pseudomys sp.

This species, not yet identified, was larger than *P. auritus*. It was apparently very abundant on the basaltic plains but has not been found in deposits in adjacent sedimentary formations.

Microchiroptera (Small Bats)

The Fern Cave and the Natural Bridge deposit each contained remains of several specimens of *Miniopterus schreibersi* (Bent-wing Bat). This is the common Victorian cave bat. At the Natural Bridge site there were also fragments of several kinds of forest-frequenting bats but these have not yet been identified. A jawbone of *Tadarida australis* was found in the Byaduk material.

Different Mammalian Faunas

The Tower Hill beach deposit and that at Bushfield are accumulations of aboriginal middens. They contain mammalian faunas similar in actual species but strikingly different when analysed numerically. At Tower Hill beach, several species which favoured a densely vegetated habitat were more strongly represented than at Bushfield, e.g. *Dasyurops maculatus*, *Isoodon obesulus*, and *Thylogale billardieri*. By contrast, *Dasyurus quoll* and *Perameles gunnii*, which frequent open country, were more plentiful in the Bushfield midden than at Tower Hill beach. To some extent this may reflect differences between the precise sites.

Remains of *Perameles nasuta* and *Aepyprymnus rufescens* were found in the Tower Hill beach midden but not at Bushfield. These are animals of the wetter, more heavily vegetated areas of SE. Australia. On the other hand, *Bettongia lesueur* is recorded from Bushfield but not Tower Hill beach. This bettong is an animal of the desert regions of Australia.

The data in these two paragraphs suggest that the Bushfield site contained a fauna of more arid general conditions than those pertaining when the more recent Tower Hill beach accumulation took place.

Gill (1953b) noted that the mammalian fossils of W. Victoria represented two distinct groups, the Pleistocene 'giant forms' and a 'post-tuff fauna which consists entirely of living species'.

Of the sites which are dealt with in this paper, the Skene Street cave at Warrnambool and the Mt Hamilton lava caves each contained elements of both groups. Each also contained *Bettongia lesueur*, which is now a desert species and therefore a possible indicator of comparatively arid conditions. If the occurrence of *Bettongia lesueur* in S. Victoria was associated with an arid period, the sub-fossil faunas with which its remains are associated indicate that such a period occurred between the time of the Pleistocene 'giant forms' and that of the modern 'post-tuff fauna'.

Disappearance of the Modern Fauna

Jones (1923-25) gave full data of the early disappearance of many South Australian mammals. Brazner (1950) listed species which no longer occurred in